Staff Exhibit 1

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE PRESIDING OFFICER

In the Matter of	)	
	)	
GRAYSTAR, INC.	)	Docket No. SSD 99-27
200 Valley Road	)	
Mt. Arlington, New Jersey 07856	)	

AFFIDAVIT OF STEPHEN A. MCGUIRE

I, Stephen A. McGuire, being duly sworn, declare as follows:

1. I am competent to make this affidavit, and the factual statements herein are true and correct to the best of my knowledge, information, and belief. The opinions expressed herein are based on my best professional judgment. A summary of my educational background, training, and employment history is enclosed as Attachment A.

2. In preparing this affidavit, I have reviewed the following documents: (1) the Commission paper, SECY-92-323, "Final Rule on Licenses and Radiation Safety Requirements for Irradiators," dated September 18, 1992, and Enclosure 1 thereto, which transmitted the draft final rule to the Commission for its approval; (2) the Staff Requirements Memorandum (SRM) dated November 2, 1992 (SRM-921027), which approved the final rule; (3) the Federal Register notice publishing the final rule and the associated statement of considerations, 58 Fed. Reg. 7715 *et seq.* (February 9, 1993); (4) the 1994 Draft Regulatory Guide DG-0003, "Guide for the Preparation of Applications for Licenses from Non-Self-Contained Irradiators;" and (5) GrayStar's written presentation, dated September 25, 2000.

3. As stated in the February 1993 *Federal Register* notice, in my position as Senior Health Physicist in the NRC's Office of Nuclear Regulatory Research, I was the designated contact person regarding the Part 36 rulemaking. I was the principal author of Part 36 and of the

Statement of Considerations (SOC) published with the final rule, and held the lead role in developing Part 36 going from 1990 forward.

4. Regarding the dispersibility issue raised by GrayStar, I intended that the wording of 10 C.F.R. § 36.21(a)(3) convey a meaning which is at variance with GrayStar's argument set forth in its filing dated September 25, 2000. To best understand the meaning of 10 C.F.R. § 36.21(a)(3), I think it is helpful to view this provision in the context of subsections 1 and 2 of 10 C.F.R. § 36.21(a). Together, these provisions state as follows:

Performance Criteria for Sealed Sources.

(a) *Requirements.* Sealed sources installed after July 1, 1993:

(1) Must have a certificate of registration issued under 10 C.F.R. 32.210;

(2) Must be doubly encapsulated;

(3) Must use radioactive material that is as nondispersible as practical and that is as insoluble as practical if the source is used in a wet-source-storage or wet-source-change irradiator.

As worded, I think it clear that the certificate of registration requirement in (1), the double encapsulation requirement in (2), and the "nondispersible as practical" requirement in the first part of (3), apply to all sealed sources to be installed in ANSI Category II, III, and IV irradiators after July 1, 1993. The "insoluble as practical" requirement in the second part of (3) only applies to sealed sources installed in ANSI Category III and IV irradiators (*i.e.*, those irradiators with storage pools) after July 1, 1993. Thus, I wrote 10 C.F.R. § 36.21(a)(3) to mean that all sealed sources to be installed in ANSI Category II, III, and IV irradiators after July 1, 1993, must use radioactive material that is as nondispersible as practical.

5. The "nondispersible" and "insoluble" requirements are stated separately within 10 C.F.R. § 36.21(a)(3) due to the differences between wet storage and dry storage irradiators, and the wording of 10 C.F.R. § 36.21(a)(3) is structured to account for these differences.

6. Some of these differences between wet storage and dry storage irradiators are as follows. The water in wet storage irradiators can cause corrosion of the source encapsulation leading to leakage of the radioactive material into the water. Leakage due to corrosion is generally not a problem with dry storage irradiators. If a leak occurs in a source in a wet storage irradiator, the water can act as a means to spread the radioactive material, especially if the radioactive material is readily soluble in water. Dispersal problems caused by radioactive material being soluble in water are generally not present in dry storage irradiators. But problems caused by radioactive material being dispersible in air and water are present in both wet and dry storage irradiators. If the source is mechanically damaged leading to rupture of the encapsulation, greater dispersibility will cause greater spread of radioactive contamination, and can result in more material becoming airborne, thereby spreading the contamination further. This can make decontamination more difficult and expensive, and can allow more radioactive material to be inhaled by people who are present.

7. If I had intended 10 C.F.R. § 36.21(a)(3) to mean that the dispersibility requirement applies only to sealed sources to be used in wet storage irradiators, I would not have twice used the phrase "as practical" in 10 C.F.R. § 36.21(a)(3). Instead, I would have worded subsection 3 of 10 C.F.R. § 36.21(a) to state:

> (3) Must use radioactive material that is as nondispersible and insoluble as practical, if the source is used in a wet-source-storage or wet-source-change irradiator.

8. Such wording would have been consistent with the wording I used in 10 C.F.R. § 36.21(a)(4), where I did intend that the requirement -- regarding use of stainless steel capsules -- be applicable only to sealed sources to be used in wet storage irradiators. I thus wrote 10 C.F.R. § 36.21(a)(4) as follows:

Performance Criteria for Sealed Sources.

(a) *Requirements.* Sealed sources installed after July 1, 1993:

(4) Must be encapsulated in a material resistant to general corrosion and to localized corrosion, such as 316L stainless steel or other material with equivalent resistance if the sources are for use in irradiator pools.

I think it is evident from this wording that this corrosion requirement applies only to sealed sources intended for use in wet-storage irradiators.

9. If I had similarly intended that the dispersibility requirement was to be applied only to sealed sources to be used in wet storage irradiators, I would not have worded 10 C.F.R. § 36.21(a)(3) as I did. This is further shown in the wording used in 10 C.F.R. § 39.41(a)(2), which I helped draft. This NRC regulation is functionally related to 10 C.F.R. § 36.21(a)(3), and states as follows:

Design and Performance Criteria for Sealed Sources.

(a) After July 14, 1989, a licensee may not use a sealed source in well logging unless the sealed source --

(2) Contains licensed material whose chemical and physical forms are as insoluble and nondispersible as practical ...

10. I was the principal author of the 1994 Draft Regulatory Guide DG-0003, "Guide for the Preparation of Applications for Licenses from Non-Self-Contained Irradiators," including the following excerpt:

> In general, the use of cesium-137 chloride is not acceptable in pool (*Category III and Category IV*) irradiators or (*Category II*) dry-source-storage irradiators that load or unload sources under water at the irradiator because it does not meet the requirements of 10 C.F.R. 36.21(a)(3). Cesium-137 chloride is generally acceptable for exclusively dry-use irradiators.

Draft Reg. Guide DG-0003, at section 3.5. The last sentence of the portion of the draft guidance excerpted above is not accurate. I do not recall why I included this statement in Draft Reg. Guide DG-0003, but it conflicts with the requirements of 10 C.F.R. §36.21(a)(3).

11. I note that my erroneous statement is not included in Volume 6 of NUREG-1556, "Consolidated Guidance About Materials Licenses, Program-Specific Guidance About Materials Licenses, Final Report," dated January, 1999. This NUREG, at page 8-5, states that for any sealed source not yet installed in an irradiator, the source "must meet the requirements" of 10 C.F.R. § 36.21. I view this statement as correcting my 1994 error.

12. The statements expressed above are true and correct to the best of my knowledge, information and belief.

Stephen A. McGuire

Sworn and subscribed to before me
this 30th day of October, 2000

Circe E. Martin
Notary Public
My commission expires: March 1, 2003

CIRCE E. MARTIN NOTARY PUBLIC MONTGOMERY CO., MD.

CIRCE E. MARTIN
NOTARY PUBLIC STATE OF [illegible]
My Commission Expires March 1, 2003

ATTACHMENT A

Resume of Stephen A. McGuire, Ph.D.

Dr. McGuire received a B. S. in Physics from St. Lawrence University in New York in 1964, an M. S. in Nuclear Engineering from the University of Wisconsin in Madison in 1966, and a Ph.D. in Nuclear Engineering from the University of Wisconsin in 1970. The American Board of Health Physics designated him as a Certified Health Physicist in 1976.

Prior to graduation, Dr. McGuire worked briefly as a staff scientist at Los Alamos Scientific Laboratory and at Argonne National Laboratory. After graduation he worked for Bechtel Corp. in nuclear power plant design and then taught postgraduate Nuclear Engineering at the Instituto Militar de Engenharia in Rio de Janeiro, Brazil. He subsequently joined the U. S. Nuclear Regulatory Commission in 1972 as a Health Physicist. From 1972 until 1999 he worked as a health physicist at the NRC primarily developing regulations, regulatory guides, and NRC policy in the area of radiation protection. Since 1999 he worked with the Incident Response Operations as a Senior Emergency Preparedness Specialist. Dr. McGuire is also currently an Adjunct Assistant Professor in the Department of Radiological Sciences at the Georgetown University School of Medicine where he gives occasional lectures and supervises graduate student thesis research.

Dr. McGuire developed the NRC's Part 36, which contains the NRC's radiation protection requirements for gamma irradiators. He also developed Draft Regulatory Guide DG-0003, "Guide for the Preparation of Applications for Licenses for Non-Self-Contained Irradiators."

His accomplishments in other areas include developing NRC's Part 39, which specifies the NRC's radiation protection requirements for well logging using radioactive materials, developing NRC's regulations on emergency preparedness for fuel cycle and other large radioactive material licensees, developing parts of NRC's regulations dealing with industrial radiography, writing a well-known and widely used radiography safety training manual, writing two Regulatory Guides for implementing the NRC's revised Part 20 (in the areas of air sampling, monitoring requirements, and methods to calculate worker doses), writing Regulatory Guides and technical reports on uranium milling, uranium bioassay, and uranium toxicity, developing a rule on the release of patients administered radioactive materials, writing a guide on instruction to workers on prenatal radiation exposure, writing a guide on how to demonstrate compliance with the NRC requirements for decommissioning, and overseeing the development of RASCAL 3.0, a code to predict the consequences of radiation releases during emergencies.